

22. (Amended) The composition of claim 1, where the antioxidant is present in an amount from about 0.5 to about 3 parts by weight per 100 parts by weight of the syndiotactic 1,2-polybutadiene.

Please cancel claim 23, without prejudice or disclaimer.

REMARKS

CLAIM OBJECTIONS

Claim 23 is objected to under 37 C.F.R. § 1.75 as being a substantial duplicate of claim 3. Claims 3 and 23 have been cancelled.

REJECTIONS UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1, 2, 4, 5, 21, and 22 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,935,160 to Kline.

Claim 1 has been amended, and therefore the Examiner's rejection under 35 U.S.C. § 102(b) has been rendered moot. Claim 1 now recites a composition comprising syndiotactic 1,2-polybutadiene. As the Examiner has found at page 3, paragraph 6, Kline does not teach syndiotactic 1,2-polybutadiene.

REJECTIONS UNDER 35 U.S.C. § 103

The Examiner has rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Kline in view of U.S. Patent No. 6,117,956 to Luo. According to the Examiner, Kline teaches the addition of dialkylaminomethyl phenols to stereoregular diene polymers to prevent oxidative degradation without concomitant discoloration. The Examiner has found that Kline teaches that those stereoregular polymers containing residues of transition metal catalysts will benefit by its teachings. Because the polymers of Luo are prepared with transition metal catalyst systems, the Examiner believes it would have been obvious to combine the teachings of Kline to prevent oxidative degradation associated with the polymers of Luo.

Reconsideration is respectfully requested. The Applicants do not believe that the Examiner has established a *prima facie* case of obviousness. The Applicants believe that Kline, when read as a whole, suggests against combining its teachings with that of

Luo. Moreover, even if, for the sake of argument, the Examiner has established a *prima facie* case of obviousness, the Applicants provide herewith evidence that rebuts this presumption.

To begin with, the preferred compositions of Kline include a combination of a dialkylaminomethyl phenol and a hindered monohydric phenolic antioxidant or hindered bisphenolic antioxidant.¹ Kline teaches that although dialkylaminomethyl phenols are metal deactivators, many are not very effective as antioxidants.² Moreover, Kline teaches that if either the phenolic antioxidant or the dialkylaminomethyl phenol is omitted, the resistance of the resulting polymer to oxidative degradation will be lower.³ Accordingly, one fully apprised of the teachings of Kline would not be inclined to employ any of the dialkylaminomethyl phenols taught by Kline within compositions containing syndiotactic 1,2-polybutadiene as taught by Luo.⁴

Furthermore, the antioxidant recited in the pending claims includes only one dialkylaminomethyl functional group that occupies a position *para* to the hydroxyl group. In contradistinction, Kline suggests that preferred results are achieved when the dialkylaminomethyl phenol includes two or three dialkylaminomethyl groups occupying at least one position *ortho* to the hydroxyl groups, most preferably occupying both *ortho* positions.⁵

Accordingly, Applicants do not believe that one of ordinary skill in the art would be motivated to practice the claimed invention having full knowledge of the teachings of Kline and extending those teachings to those of Luo.

Furthermore, even though certain compounds, albeit less preferred, taught by Kline meet the definition of the antioxidant of the pending claims, the Applicants nonetheless believe that the pending claims are patentable because the art of choosing a suitable antioxidant or a particular polymer is largely unpredictable and empirical. In fact, not all dialkylaminomethyl phenols taught by Kline, especially the preferred compounds, will be effective in stabilizing syndiotactic 1,2-polybutadiene. To this end, the Declaration of Dr. Steven Luo is submitted herewith. Within this Declaration, Dr.

¹ Column 3, lines 44-46.

² *Id.* at lines 46-48.

³ *Id.* at lines 66-68.

⁴ Applicants also note that the polymers that Kline seems to be concerned with are elastomeric stereoregular polymers whereas the syndiotactic 1,2-polybutadiene taught by Luo and recited in the pending claims is a crystalline thermoplastic resin.

⁵ Column 2, lines 1-5.

Luo demonstrates that 2,4,6-tris(dimethylaminomethyl)phenol, which is a preferred compound under the teachings of Kline, is ineffective in preventing syndiotactic 1,2-polybutadiene from thermal crosslinking. Accordingly, Applicants maintain that even if, for the sake of argument, the Examiner has established a *prima facie* case of obviousness, this evidence overcomes any presumption associated therewith.

PREVIOUS OFFICE ACTION

Applicants acknowledge that the previous arguments in the face of Ueno et al., Luo, or Oozeki in view of Ceska successfully overcame the previous rejections.

CONCLUSION

In view of the foregoing amendments and arguments presented herein, the Applicants believe that they have properly set forth the invention and accordingly, respectfully request the Examiner to reconsider the rejections provided in the last Office Action. A formal Notice of Allowance of claims 1, 2, 4-10, 12-19, and 21-22 is earnestly solicited. Applicants accordingly request that claims 6-20 be rejoined with claims 1-5 and 21-22. Should the Examiner care to discuss any of the foregoing in greater detail, the undersigned attorney would welcome a telephone call.

No new claims have been added and therefore no additional fees are believed due at this time. Nonetheless, in the event that a fee required for the filing of this document is missing or insufficient, the undersigned attorney hereby authorizes the Commissioner to charge payment of any fees associated with this communication or to credit any overpayment to Deposit Account No. 06-0925.

Respectfully submitted,



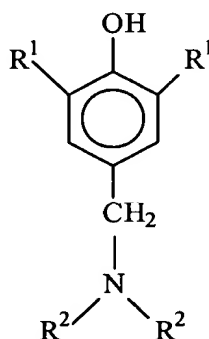
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MARKED-UP CLAIMS

1. (Amended) A stabilized [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene composition comprising:

a [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene, and
 an antioxidant defined by the formula



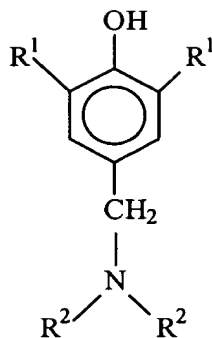
where each R¹ and R², which may be the same or different, are mono-valent organic groups, or where each R¹, which may be the same or different, is a mono-valent organic group and the two R² groups join to form a divalent organic group.

2. (Amended) The composition of claim 1, where the antioxidant is present in an amount from about 0.1 to about 10 parts by weight per 100 parts by weight of the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene.

6. (Amended) A method of stabilizing [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene from thermal crosslinking, the method comprising:

providing a composition of matter comprising [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene; and

adding to the composition an antioxidant defined by the formula



where each R¹ and R², which may be the same or different, are mono-valent organic groups, or where each R¹, which may be the same or different, is a mono-valent organic group and the two R² groups join to form a divalent organic group, thereby forming a mixture of [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene and antioxidant.

8. (Amended) The method of claim 6, where the composition of matter comprising [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene includes a solvent that forms a cement with the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene; and the method further comprising the step of isolating the mixture of [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene and the antioxidant from the solvent after said step of adding the antioxidant.

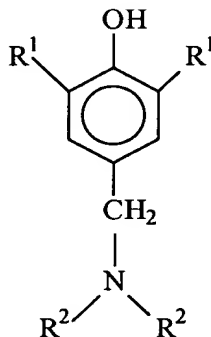
9. (Amended) The method of claim 6, further comprising the step of adding tris(nonylphenyl) phosphite to the composition of matter comprising [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene.

10. (Amended) The method of claim 6, where said step of adding the antioxidant includes adding from about 0.1 to about 10 parts by weight of the antioxidant per 100 parts by weight of the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene.

12. (Amended) A method of preparing a vulcanizable composition of matter, the method comprising:

providing a composition of matter comprising [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene;

adding to the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene composition an antioxidant defined by the formula



where each R¹ and each R², which may be the same or different, are mono-valent organic groups, or where each R¹, which may be the same or different, is a mono-valent organic group and the two R² groups join to form a divalent organic group, thereby forming a mixture of [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene and antioxidant;

providing a rubber; and

compounding the rubber with the mixture of the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene and antioxidant.

13. (Amended) The method of claim 12, where the composition of matter comprising [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene includes a solvent that forms a cement with the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene; and the method further comprising the step of isolating the mixture of [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene and the antioxidant from the solvent after said step of adding the antioxidant.

16. (Amended) The method of claim 13, where said step of isolating includes steam desolventizing the cement and drying the mixture of [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene and antioxidant at a temperature in excess of 100°C.

17. (Amended) The method of claim 12, further comprising the step of adding tris(nonylphenyl) phosphite to the composition of matter comprising [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene.

18. (Amended) The method of claim 12, where said step of adding the antioxidant includes adding from about 0.1 to about 10 parts by weight of the antioxidant per 100 parts by weight of the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene.

19. (Amended) The method of claim 12, where said step of compounding includes mixing the rubber and mixture of [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene and antioxidant at a temperature in excess of 100°C.

21. (Amended) The composition of claim 1, where the antioxidant is present in an amount from about 0.2 to about 5 parts by weight per 100 parts by weight of the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene.

22. (Amended) The composition of claim 1, where the antioxidant is present in an amount from about 0.5 to about 3 parts by weight per 100 parts by weight of the [high-vinyl polybutadiene] syndiotactic 1,2-polybutadiene.